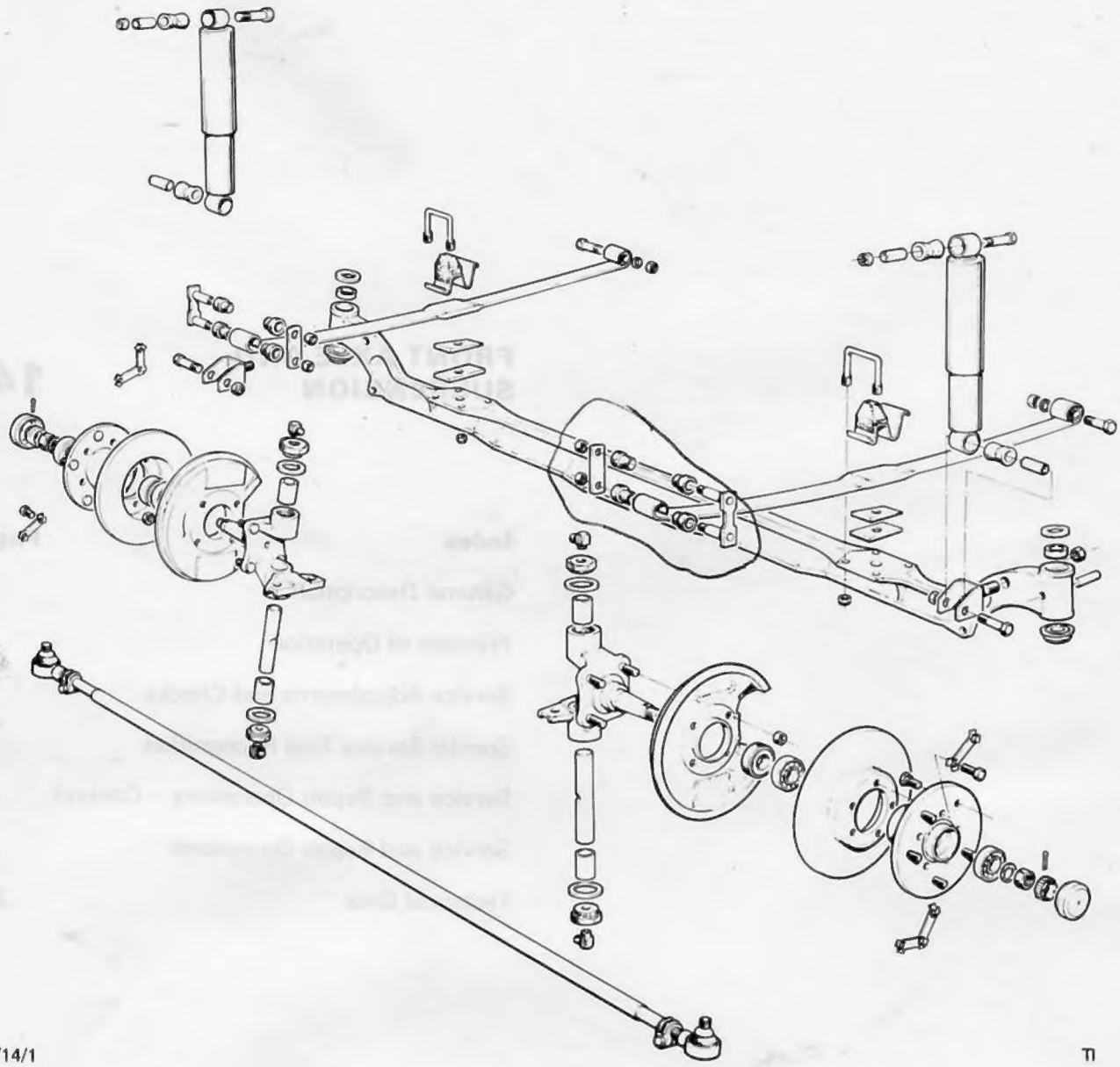
GENERAL DESCRIPTION



TR/14/1 TI

Fig. 1. Transit front axle and suspension assembly

GENERAL DESCRIPTION

The Transit front axle and suspension system is comprised of a forged steel I section beam axle supported by two single-leaf, semi-elliptic parabolic taper road springs. Telescopic shock absorbers are mounted between the axle beam and vehicle body to dampen vehicle oscillations, particularly over uneven road surfaces.

The hubs are mounted on stub axles connected to the axle beam by vertical kingpins, with parallel grooved pins driven into the axle beam to lock the kingpin in position. Two taper roller bearings are located on each stub axle and run in cups pressed into the wheel hub. The wheel mounting studs are a splined and pressed fit into the hub flange. Rubber bushes are fitted at the mounting points for the road springs and shock absorbers.

PRINCIPLE OF OPERATION

The Transit front axle and suspension assembly fulfils two functions:

1. Damping the effect of road irregularities on vehicle ride.
2. Allowing the front wheels to turn in response to steering control.

The first objective is achieved by cushioning the movement imparted to the front road wheels, through semi-elliptic leaf springs. The energy created is dampened by telescopic shock absorbers. The transmission of road noise and vibration is minimised by rubber insulated mounting points between the chassis and springs and between the chassis and shock absorber.

The second objective is achieved by the front hub assemblies pivoting in response to steering movement. The pivot centres are spindle bolts locked to the axle by parallel grooved pins.

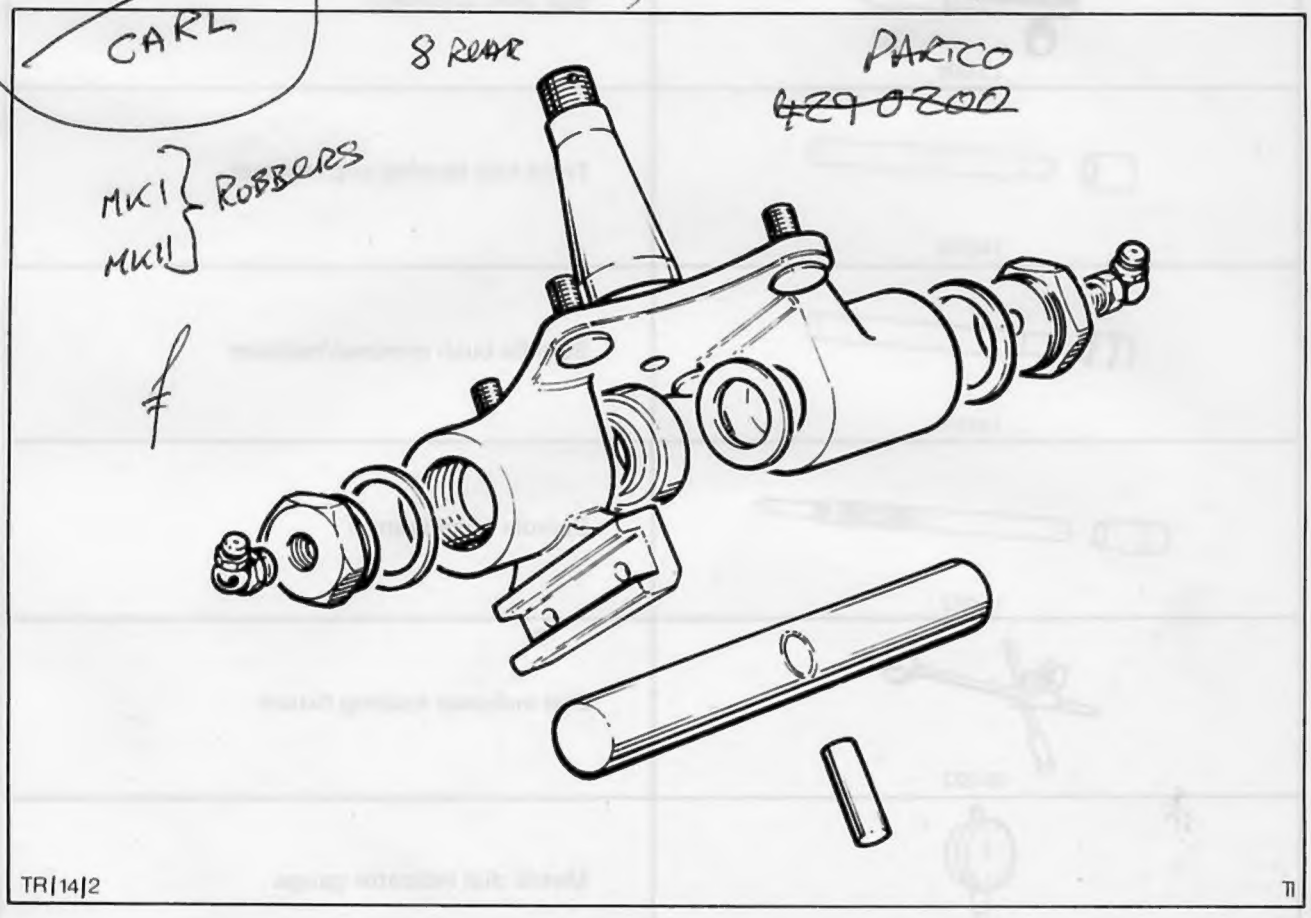


Fig. 2. Front stub axle assembly

SERVICE ADJUSTMENTS AND CHECKS

At specified service intervals, the following checks should be carried out:

Shock Absorbers

Check for evidence of oil leaks on front shock absorbers.

Ball Joints, Bushes and Mountings

Check condition of all ball joints, bushes and mountings.

If the above checks reveal evidence of excessive wear of faulty operation, the relevant items should be replaced by reference to the operations within this section of the workshop manual.

Check front wheel bearings for correct adjustment. Adjust bearings, if necessary. Refer to Operation No. 14-303 for procedure.

If uneven tyre wear is evident, or if accident damage to the front suspension is suspected, a check on the toe setting of the vehicle should be carried out.

Toe-setting

Check the front wheel toe-setting. Refer to Operation No. 14-117

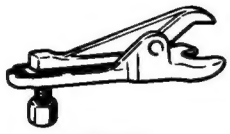
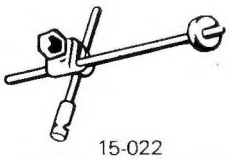
Kingpin Lubrication

Grease the nipples fitted on each end of the kingpin retaining nuts, using grease meeting Ford Specification SMIC-4515A, until grease appears.

'U' Bolts

Check and if necessary adjust the tightening torque of the 'U' bolt nuts.

SPECIAL SERVICE TOOL RECOGNITION

Tool	Tool Name
 13-006	Ball joint separator
14-010	Front hub bearing cup replacer
14-011	Spindle bush remover/replacer
14-012	Spindle bush reamer
 15-022	Dial indicator holding fixture
15-046	Metric dial indicator gauge

SERVICE AND REPAIR OPERATIONS – CONTENT

FRONT AXLE AND SUSPENSION		Described in this publication	Contained in operation	Also applicable to certain variants in the listed model range					
				Transit '7	Fiesta	Escort '75 onwards	Capri	Taunus '76/Cortina '77	Granada '78 onwards
14 111	Front wheel alignment – check	X		X					
14 117	Toe-in – check and adjust	X		X	X	X	X	X	X
14 212	Front axle and suspension assembly – remove and install	X		X					
14 214	Front axle assembly – remove and install	X		X					
14 218 4	Beam – front axle – replace	X		X					
14 363	Stub axle – remove and install	X		X					
14 365	Bushes – stub axle – replace	X		X					
14 371	Hub assembly – front – remove and install	X		X					
14 371 6	Hub assembly – front – replace	X		X		X	X	X	X
14 403	Wheel bearings – adjust	X		X					
14 411 4	Wheel bearings – replace – inner and outer	X		X	X	X	X	X	X
14 414 4	Wheel bearing – front – inner – replace	—	14 411 4	X	X	X	X	X	X
14 416 4	Wheel bearing – front – outer– replace	—	14 411 4	X	X	X	X	X	X
14 423 4	Grease retainer – front wheel bearing – replace	—	14 411 4	X	X	X	X	X	X
14 443	Stud – replace	X		X	X	X	X	X	X
14 621	Front spring – remove and install	X		X					
14 653	Bushes – front spring replace – all	X		X					
14 665	Bush – front spring hanger – replace	—	14 653	X					
14 673	'U' bolts – front spring – replace	X		X					
14 791	Shock absorber – remove and install	X		X					

SERVICE AND REPAIR OPERATIONS

14 111 FRONT WHEEL ALIGNMENT – CHECK (Castor, Camber, Toe-setting)

Special Service Tools Required:

The following procedure utilises Optoflex equipment. If alternative equipment is used the manufacturers instructions must be used.

NOTE: Vehicle must be checked in unladen condition.

1. Before carrying out a wheel alignment check, suspension and steering components should be examined to ensure there are no signs of damage, wear or maladjustment. Tyre pressures should also be checked, and corrected if necessary.
2. Position vehicle in correct position relative to optoflex screen and on a level surface with front wheels on locked turntables and rear wheels on wooden blocks of same height as turntables.
3. Secure projectors to front wheels. Projector pivot must be aligned to centre of wheel, Fig. 3.
4. Jack up front wheel and adjust projector bracket to eliminate wheel run out. Jack should be positioned under axle as near to front wheel as possible. Run out is eliminated by rotating wheel and observing movement of projected image on screen. Position wheel at maximum run out position and adjust bracket by turning adjusting screw nearest to horizontal plane, Fig. 4.
5. Remove locking pin from turntable and lower wheel onto centre of turntable.
6. Repeat sub-operations 4 and 5 for other wheel Bounce front of vehicle at centre of bumper to settle suspension and ensure the turntables do not bind at 20° lock (both LH and RH).
7. Fit pedal depressor to footbrake to lock front wheels, Fig. 5.
8. By turning steering wheel, align RH front wheel to straight ahead position. Aim projector at mirror through cut-out in screen and reflect image back onto projector. Focus image, turn wheel to align image centre with zero mark on projector. Wheel is now exactly in straight ahead position. Do not move this wheel until sub-operation 10.
9. Refocus projector onto screen and slide RH screen across to align zero setting of toe-in/out to centre of image.
10. By turning steering wheel align LH front wheel to straight ahead position as sub-operation 8.
11. Record toe-in/out from position of projected image on RH screen. This is total toe-in or out, Fig. 6.

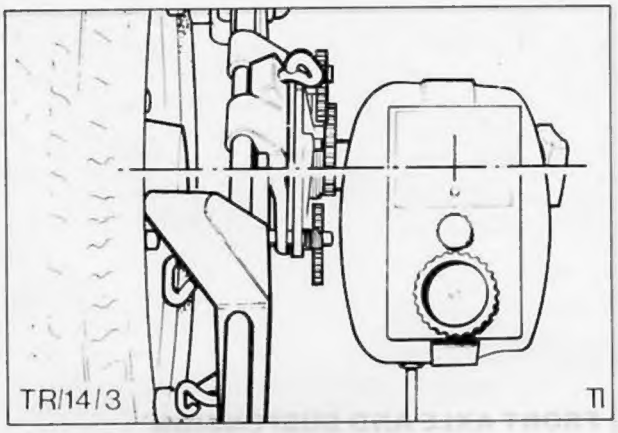


Fig. 3. When fitting equipment ensure projector spindle is in line with wheel centre

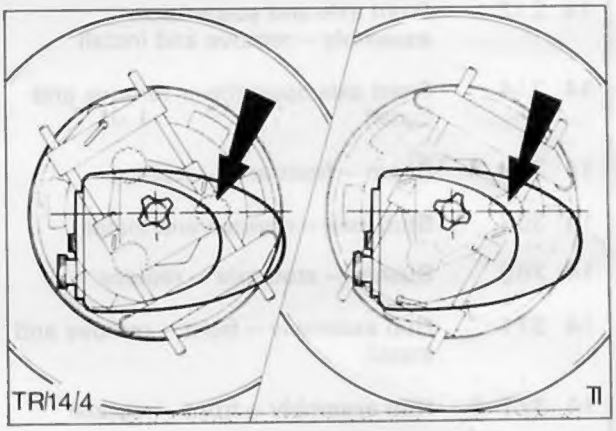


Fig. 4. A and B show two possible positions of adjuster Always use adjuster nearest horizontal plane

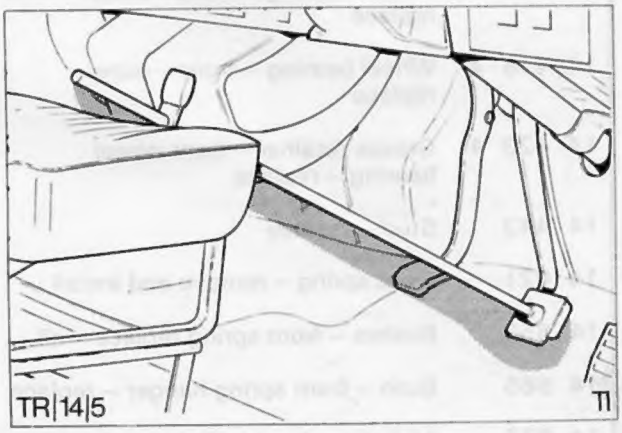


Fig. 5 Foot brake pedal depressor

12. Align LH side of screen to LH projected image. Repeat as for sub-operation 9.
13. Record camber for both wheels. A direct reading is obtained for each wheel from the projected image. Reading is shown by a fine line across each scale.
14. Turn RH wheel to left 20° lock position at horizontal line and zero projected castor scale by turning knob positioned above projector lens.
15. Turn RH wheel to right 20° lock position at horizontal line and record castor angle from projected scale.
16. Repeat sub-operations 14 and 15 for LH wheel, setting castor zero with wheel on right 20° lock and reading value on left 20° lock.
17. Remove pedal depressor and projectors from vehicle and remove vehicle from turntables.
18. Compare values obtained with specified tolerances.

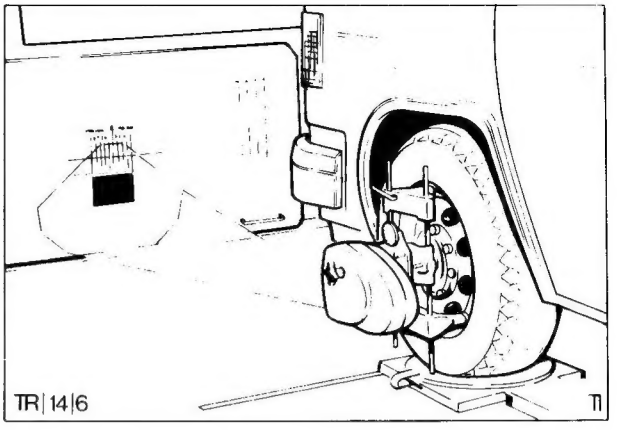


Fig. 6. Projector showing total toe-in.

14 117 TOE-IN-CHECK AND ADJUST

Equipment Required:

Suitable tracking gauge, i.e. Dunlop, Churchill and Lowener.

(Following procedure is based on above equipment, if other equipment is used follow manufacturers instructions.)

For equipment with a facility to eliminate effects of wheel/tyre run-out (e.g. Optoflex) it is only required to take one toe-in reading. However for equipment that does not incorporate a facility to eliminate wheel/tyre runout (i.e. Churchill type 96 gauge) it is necessary to take two toe readings at wheel centre height on wheel rim edges.

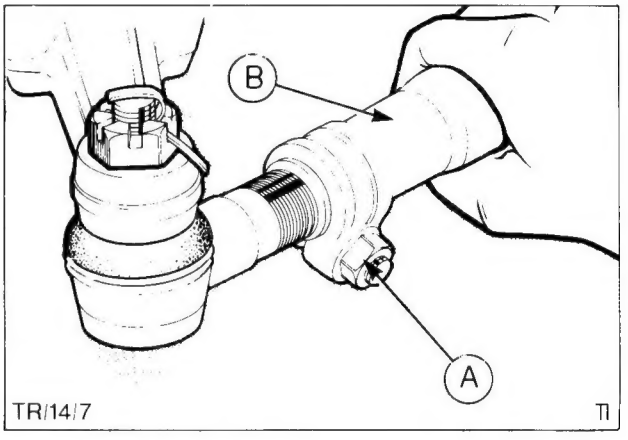


Fig. 7. Adjusting toe-in.

Second reading must be recorded at a position on the wheels exactly 180° from first reading, and two readings averaged to reduce effects of wheel/tyre runout, and give actual toe measurement.

Important: Vehicle should be in an unladen condition and must be rolled forwards onto a flat level surface before commencing toe measurement check.

Position toe setting gauge at front inner edge of wheels, roll vehicle forward so that wheels rotate through 180° and note toe setting reading. Mark tyre.

Remove gauge and re-locate at front inner edge of wheels. Roll vehicle foward so that wheels rotate through 180° and note toe setting reading.

Combine two readings and average out to reduce effects of wheel/tyre runout and give an actual toe measurement figure.

If the toe-in figure is outside specification then it should be adjusted as follows:
NOTE: The connecting rod ends have left and right hand threads. Thus, the overall length of the assembly can be adjusted by slackening the clamp bolts and rotating the connecting rod. It is not necessary to detach either end of the rod.

1. Loosen clamp bolts on connecting rod.
2. Rotate rod in the appropriate direction to achieve the specified toe-in figure, Fig. 7.
3. Tighten clamp bolts.

14 212 FRONT AXLE AND SUSPENSION ASSEMBLY – REMOVE AND INSTALL

Special Service Tools Required:

Ball joint separator 13 006

To Remove

1. Remove hub caps, if fitted, loosen wheel nuts. Jack-up front of vehicle, fit stands.
2. Remove wheel nuts, and remove front road wheels.
3. Remove split pin and remove nut from joint at drag link and drop arm.
4. Separate drag link and cranked arm joint by using ball joint separator tool 13 006, Fig. 8.
5. Disconnect shock absorbers from top mountings on both sides.
6. Disconnect brake hoses from caliper on both sides.
7. With a suitable jack placed under the axle beam support the weight of the axle.
8. Remove two nuts from each rear shackle plate on either side and remove rear shackle plate, Fig. 9.
9. Remove front spring eye bolts on each side.
10. Lower axle and suspension assembly to ground and withdraw from vehicle.

To Install

11. Reposition assembly under vehicle and raise in to position using a suitable jack.
12. Fit front spring eye bolts, Fig. 10, through body brackets and front springs.
13. Fit rear shackle plates and secure with nuts.
14. Take up the weight of the vehicle with the jack and torque the front spring eye bolts, and the rear shackle plate nuts, to the specified torques. When taking up the weight of the vehicle care must be taken not to raise the vehicle off the stands.
15. Reconnect front brake hoses to calipers.
16. Reconnect shock absorbers to top body mountings.
17. Connect drag link to drop arm, fit nut and secure with a new split pin.
18. Bleed brake circuit, refer to Operation 12-141.
19. Refit wheels, lower vehicle to ground, finally tighten wheel nuts, to specified torque and refit hub caps, if fitted.

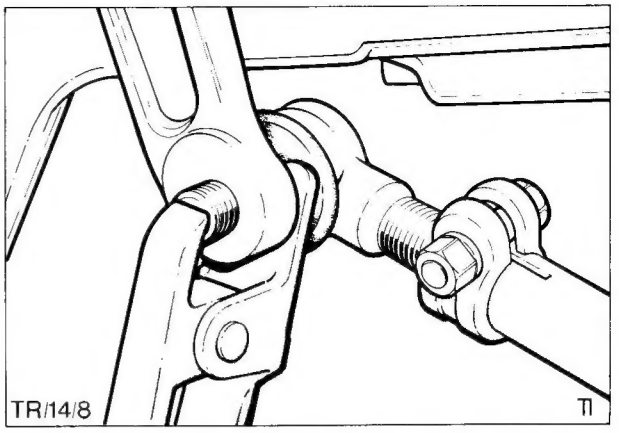


Fig. 8. Separating drag link and cranked arm joint using tool 13 006

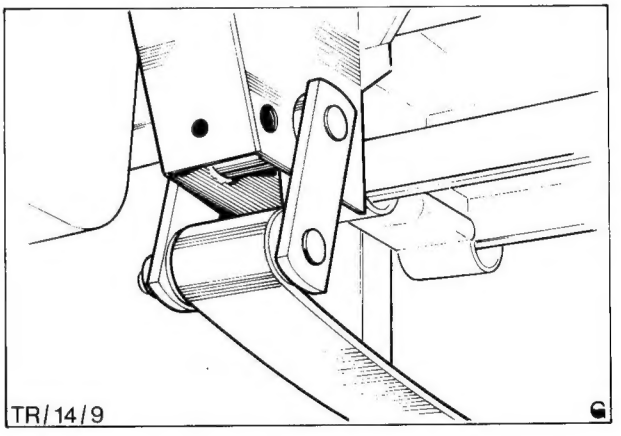


Fig. 9. Rear spring shackle plate

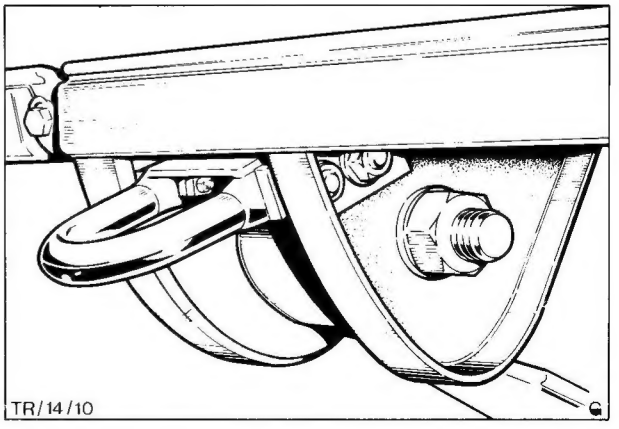


Fig. 10. Front spring eye bolts

14 214 FRONT AXLE ASSEMBLY – REMOVE AND INSTALL

Special Service Tools Required:

Ball joint separator 13 006

To Remove

1. Remove hub caps where fitted, slacken off front wheel nuts.
2. Jack-up, fit stands and remove front road wheels.
3. Remove split pin and nut and separate drag link from steering arm, using ball joint separator 13-006.
4. Remove lower shock absorber mounting nuts and withdraw bolts both sides, Fig. 11.
5. Disconnect brake hoses from front calipers.
6. Support the axle beam on a jack.
7. Remove two 'U' bolts securing beam to spring on both sides and lower axle beam and withdraw from vehicle.

To Install

8. Position axle beam relative to springs.
9. Raise axle and secure to springs with 'U' bolts, ensuring packing wedges and bump stops are correctly fitted. Wedges fit with the thickest portion towards the rear, Fig. 12.
10. Reconnect brake hoses both sides, Fig. 13.
11. Insert lower shock absorber bolts through lower shock absorber bush and secure with nut, tightening to the specified torque.
12. Reconnect drag link to drop arm and secure nut with new split pin.
13. Bleed brakes refer to Operation 12 141.
14. Fit both front road wheels.
15. Lower vehicle and finally tighten wheel nuts. Finally torque 'U' bolt nuts, refer to Technical Data for correct tightening sequence.
16. Refit hub caps, where applicable.

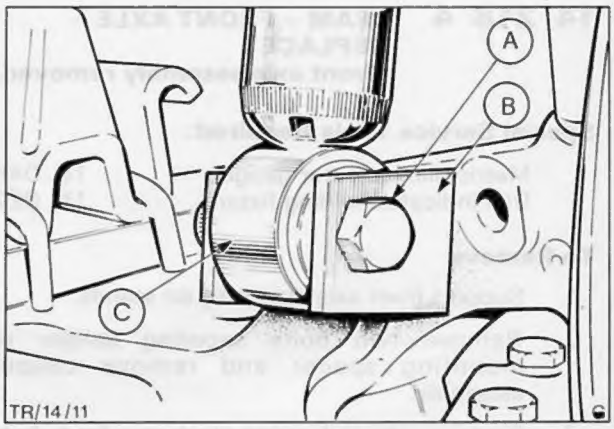


Fig. 11. Lower shock absorber mounting

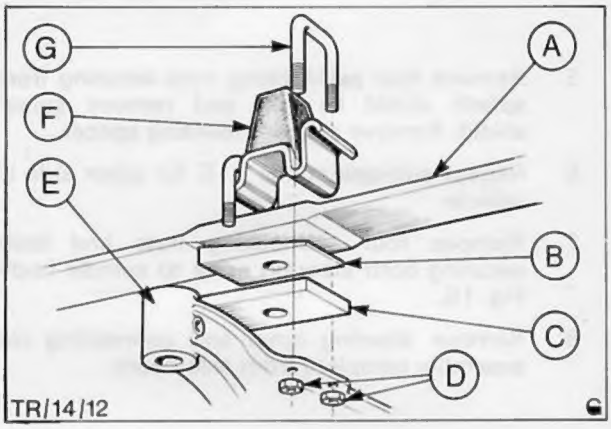


Fig. 12. Front spring and 'U' bolt assembly

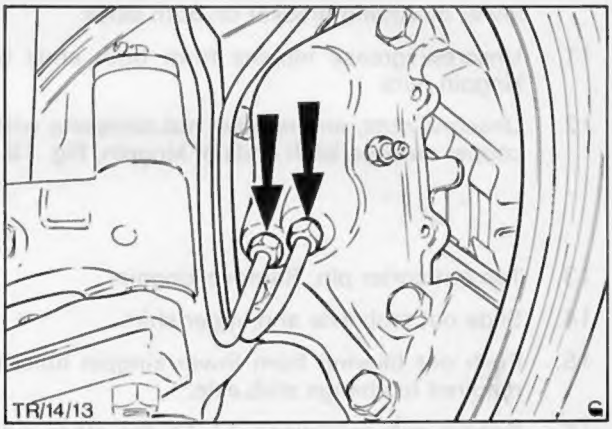


Fig. 13. Front brake hose connection to caliper (horizontally split braking system shown)

14 218 4 BEAM – FRONT AXLE – REPLACE (Front axle assembly removed)

Special Service Tools Required:

Metric dial indicator gauge	15 046
Dial indicator holding fixture	15 022

To Remove

1. Support front axle assembly on stands.
2. Remove two bolts securing caliper to mounting spacer and remove caliper assembly.
3. Remove wheel bearing dust cap from hub. Remove split pin, nut retainer, adjusting nut, washer and outer bearing, Fig. 14.
4. Remove front hub and disc assembly from front axle spindle.
5. Remove four self-locking nuts securing front splash shield to axle and remove splash shield. Remove caliper mounting spacer.
6. Repeat sub-operations 2–5 for other side of vehicle.
7. Remove four self-locking nuts and bolts securing both steering arms to spindle body, Fig. 15.
8. Remove steering arms and connecting rod assembly complete from axle beam.
9. Remove spring 'U' bolts and nuts, from each spring and remove both springs bump stops, and packing wedges from axle beam.
10. Remove nut and bolt from shock absorber lower mounting bracket on both sides.
11. Unscrew grease nipples from both ends of kingpin nuts.
12. Unscrew nuts, and remove nut complete with copper washer, both ends of kingpin, Fig. 16.
13. Tap out cotter pin. Remove kingpin.
14. Slide out stub axle and upper shim.
15. Push out bearing from lower kingpin hole, if required to change stub axle.
16. Repeat sub-operations 11-15 for other side of axle.

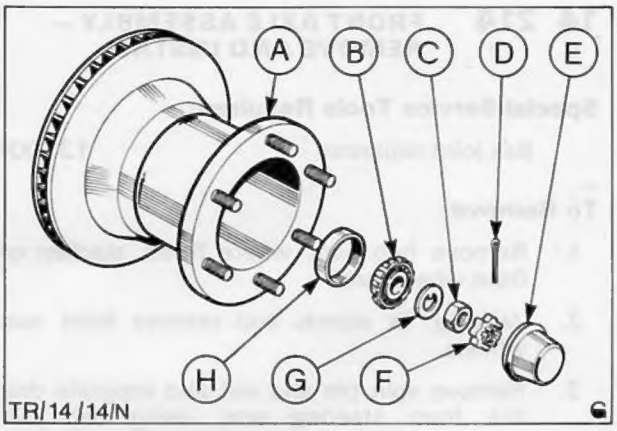


Fig. 14. Front hub and bearing assembly

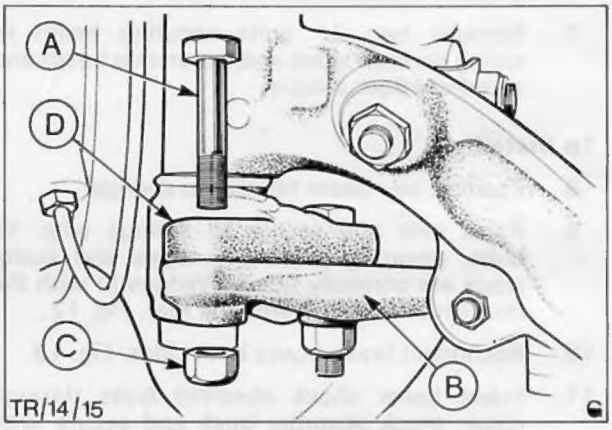


Fig. 15. Removing nuts and bolts securing steering arm to spindle body

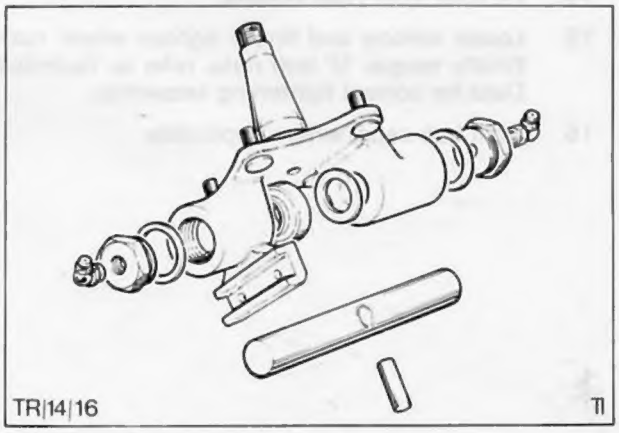


Fig. 16. Front stub axle and kingpin assembly

To Replace

17. Refit lower kingpin hole bearing if removed in sub-operation 15.

18. Refit stub axle to axle beam ensuring shim, Fig. 17, is fitted between top face of stub axle and lower face of upper hole in axle beam. Select shims to give a maximum clearance of 0,1 mm (0,004 in) and a minimum clearance of 0,025 mm (0,001 in). Insert kingpin.

19. Align cut-out in kingpin with hole in axle beam and refit cotter pin.

20. Refit nuts and copper washers to both ends of kingpin.

21. Refit grease nipples both ends of kingpin nuts.

22. Repeat sub operations 17–21 for other side of axle beam. Lubricate grease nipples on stub axle with grease meeting Ford Specification SM-IC-4515-A until grease appears. Clean off excess grease.

23. Refit lower shock absorber mounting brackets to axle beam and secure with nut and bolt both sides.

24. Refit springs to axle beam, Fig. 19. Ensure packing piece and wedge is fitted between spring and axle, and that wedge has its thickest position rearwards. Secure springs and bump stop to axle with 'U' bolts and nuts, both sides.

25. Refit steering arms and connecting rod assembly to spindle body and secure with four bolts and self-locking nuts.

26. Refit splash shield to stub axle, secure with self-locking nuts, both sides.

27. Refit caliper mounting spacer. Clean spindle. Renew grease retainer if damaged, Fig. 18.

28. Refit hub and disc assembly onto spindle.

29. Refit outer wheel bearing, washer, and retaining nut.

30. Tighten wheel bearing retaining nut to a torque of 23 to 33 Nm whilst rotating hub to seat the wheel bearings.

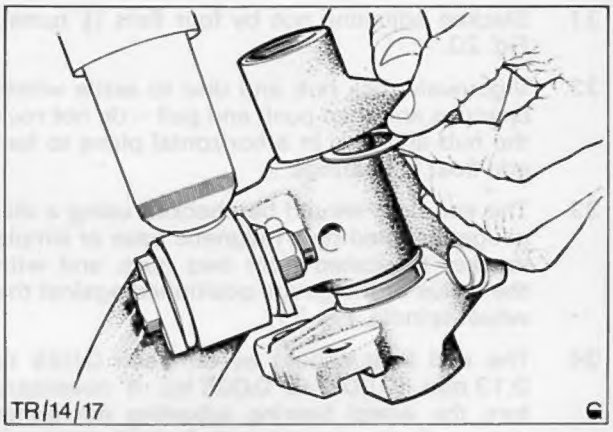


Fig. 17. Fitting shim between stub axle and axle beam

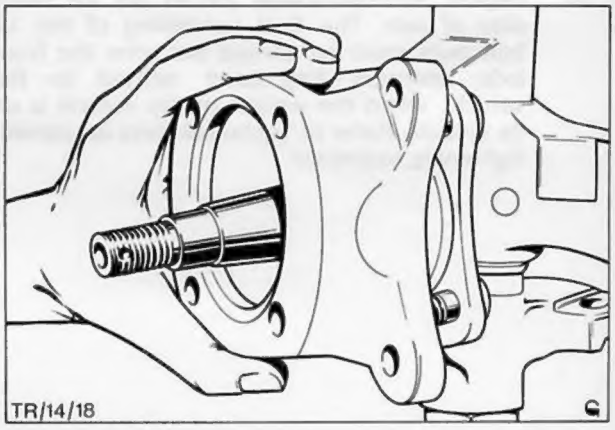


Fig. 18. Replacing caliper mounting spacer

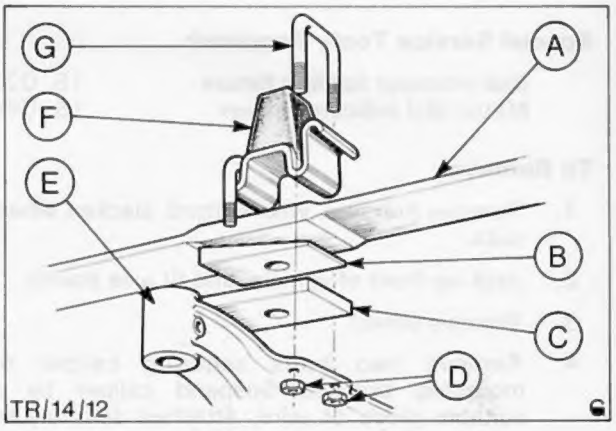


Fig 19. Front spring and wedge assembly

31. Slacken adjusting nut by four flats ($\frac{2}{3}$ turns), Fig. 20.

32. Vigorously rock hub and disc to settle wheel bearings and then push and pull – do not rock the hub and disc in a horizontal plane to feel end float in bearings.

33. The end float should be checked using a dial gauge fastened by a magnetic base or simple bracket fabricated from two nuts, and with the stylus of the gauge positioned against the wheel spindle, Fig. 21.

34. The end float should be between 0,025 to 0,13 mm (0,001 to 0.005 in). If necessary turn the wheel bearing adjusting nut either way until the correct end float is obtained. Remove dial indicator gauge.

35. Fit retainer and new split pin. Fit dust cap. Refit caliper and secure with two bolts. Bleed brake circuit. Refer to Operation 12 141.

36. Repeat sub-operations 27 to 35 for other side of axle. The final tightening of the 'U' bolt nuts must be carried out after the front axle assembly has been refitted to the vehicle, when the weight of the vehicle is on its wheels. Refer to Technical Data for correct tightening sequence.

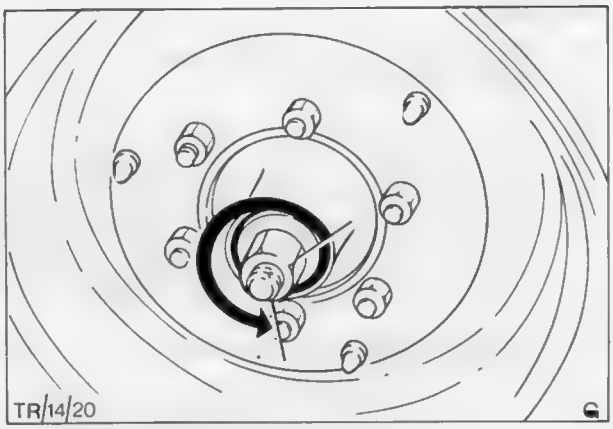


Fig. 20. Slacken nut $\frac{2}{3}$ turns

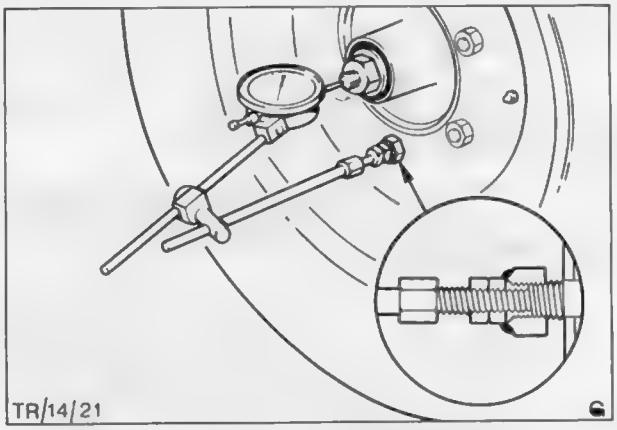


Fig. 21. Checking end float

14 363 STUB AXLE – REMOVE AND INSTALL

Special Service Tools Required:

Dial indicator holding fixture	15 022
Metric dial indicator gauge	15 046

To Remove

1. Remove hub cap, where fitted, slacken wheel nuts.
2. Jack-up front of vehicle, and fit axle stands.
3. Remove wheel.
4. Remove two bolts securing caliper to mounting bracket. Suspend caliper by a suitable piece of wire, attached securely to vehicle. On vehicles with horizontal split braking system, disconnect fluid line.

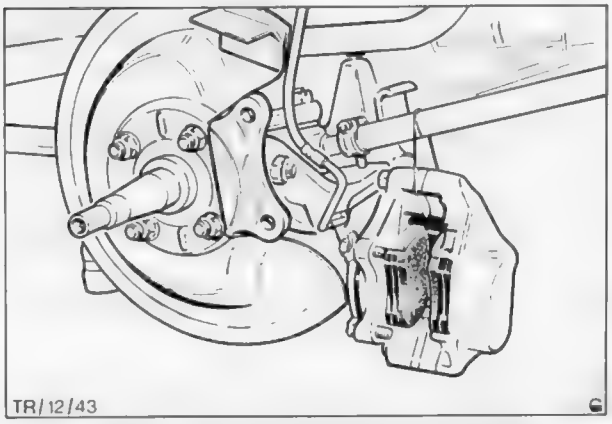


Fig. 22. Suspend caliper by a suitable piece of wire. (Hub and disc removed for clarity)

5. Remove dust cap, split pin, nut retainer, and wheel bearing adjusting nut. Remove washer and hub/disc assembly complete with outer bearing.
6. Remove four self-locking nuts securing splash shield to spindle.
7. Remove caliper.
8. Remove two nuts and bolts securing steering arm to stub axle and lower steering arm clear of stub axle.
9. Unscrew grease nipples from both ends of kingpin nuts.
10. Unscrew kingpin nut, Fig. 23, and copper shims and remove.
11. Tap out cotter pin and remove kingpin.
12. Slide out stub axle and upper shim.
13. Push out bearing from lower kingpin hole, Fig. 24.

To Install

14. Refit bearing to lower kingpin hole.
15. Refit stub axle to axle beam. Select and fit shims to give a maximum clearance of 0,1 mm (0,004 in) and a minimum clearance of 0,025 mm (0,001 in) between the top face of stub axle and lower face of upper hole in axle beam. Insert kingpin.
16. Align cut-out in kingpin with hole in axle beam and refit cotter pin, Fig. 25.
17. Refit nuts and copper washers to both ends of kingpin.
18. Refit grease nipples both ends. Lubricate grease nipples with grease meeting Ford Specification SM- 1C-4515-A until grease appears. Clean off excess grease.
19. Refit steering arm to stub axle and secure with two nuts and bolts.
20. Refit caliper mounting bracket.
21. Refit caliper splash shield and secure with self-locking nuts.
22. Refit hub and disc assembly. Refit outer bearing, washer and adjusting nut. Refit wheel. Tighten wheel nuts.
23. Tighten wheel bearing retaining nut to a torque of 23 to 33 Nm (2,35 to 3,5 kg f.m) (17 to 25 lbf.ft) whilst rotating hub to seat the wheel bearings.
24. Slacken adjusting nut by four flats ($\frac{2}{3}$ turns.)

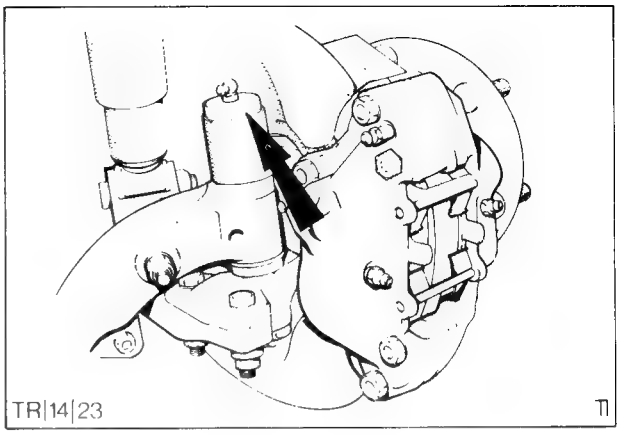


Fig. 23. Removing kingpin nut

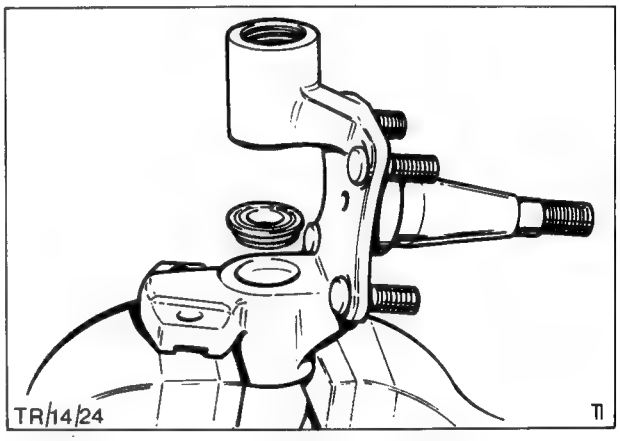


Fig. 24. Removing bearing from lower kingpin hole

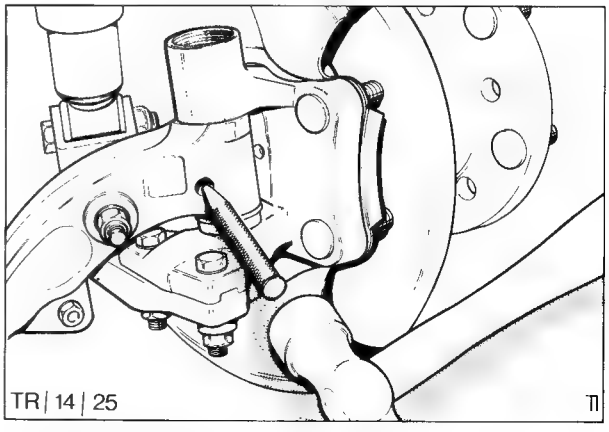


Fig. 25. Refitting cotter pin

25. Vigorously rock hub and disc to settle wheel bearings and then push and pull do not rock the hub and disc in a horizontal plane to feel end float in bearings.
26. The end float should be checked using a dial gauge fastened by a magnetic base or simple bracket fabricated from two nuts, and with the stylus of the gauge positioned against the wheel spindle, Fig. 26.
27. The end float should be between 0,025 to 0,13 mm (0,001 to 0,005 in). If necessary turn the wheel bearing adjusting nut either way until the correct end float is obtained. Remove dial indicator gauge.
28. Fit retainer and new split pin. Fit dust cap. Refit caliper and secure with two bolts. Reconnect fluid tube, bleed brake circuit where applicable. Refer to Operation 12 141.
29. Lower vehicle to ground.
30. Finally tighten wheel nuts to specified torque and fit hub cap.

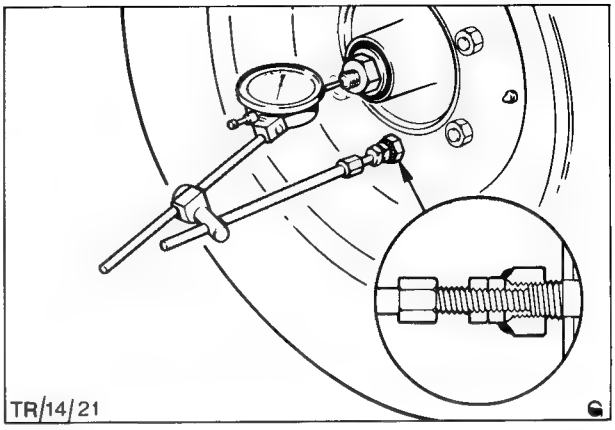


Fig. 26. Dial gauge mounted to check bearing end float

14 365 BUSHES – STUB AXLE – REPLACE

Special Service Tools Required:

Spindle bush remover/replacer	14 011
Spindle bush reamer	14 012

To Remove

1. Remove stub axle assembly as described in Operation 14–363.
2. Place stub axle in a vice, or other suitable fixture, ensuring that jaws are protected.
3. Using Tool No. 14 011 remove upper stub axle bushes from the axle, Fig. 27.
4. Invert stub axle and remove lower bush using Tool No. 14 011.
5. Clean the stub axle prior to fitting new bushes.

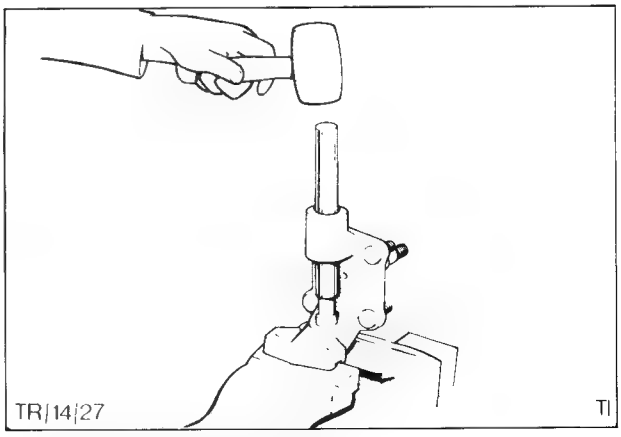


Fig. 27. Removing stub axle bushes

To Replace

6. Using Tool No. 14 011, fit new bush to stub axle ensuring bush is pushed fully home, Fig. 28.
7. Invert stub axle and fit other new bush.
8. Assemble reamer Tool 14 012, and set size of cutting teeth to 21,84 $^{+0.02}_{-0.00}$ mm (0,86 $^{+0.0007}_{0.00}$ in)
9. Fit reaming guide to the underside of the lower bush hole and pass reamer through the stub axle bushes. The reamer should be lubricated with clean oil to ensure a smooth finish is obtained, Fig. 29.
10. Refit stub axle assembly as described in Operation 14-363.

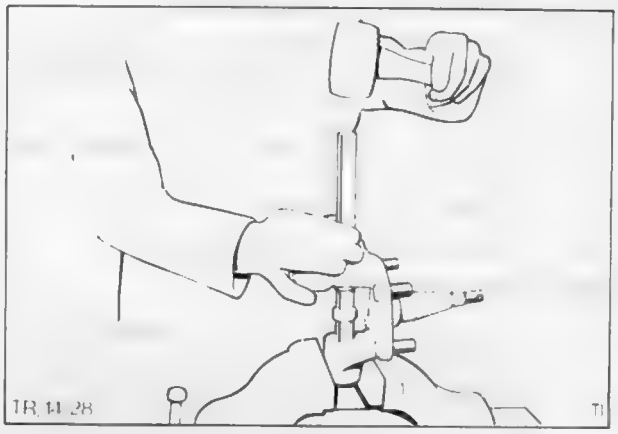


Fig. 28. Replacing stub axle bushes

14 371 HUB ASSEMBLY – FRONT – REMOVE AND INSTALL

Special Service Tools Required: None

To Remove

1. Remove hub cap, where fitted, loosen wheel nuts. Raise front of vehicle and fit stands. Remove road wheel.
2. Remove caliper mounting bolts and detach the caliper assembly. Support the caliper clear of the hub assembly by a suitable length of wire. On vehicles with horizontally split braking system, disconnect fluid tube and remove caliper.
3. Remove dust cap from wheel bearing. Remove split pin, nut retainer, nut and washer.
4. Remove hub and disc assembly from stub axle spindle, Fig. 30.

To Install

5. Refit hub and disc assembly onto spindle.
6. Refit washer, adjuster nut.
7. Position caliper, secure with two bolts. Reconnect fluid tube where applicable. Bleed brake circuit. Refer to Operation 12 141.
8. Refit road wheel and tighten wheel nuts.
9. Adjust wheel bearing as described in operation 14-303.
10. Lower vehicle to ground, fully tighten wheel nuts, if applicable refit hub cap.

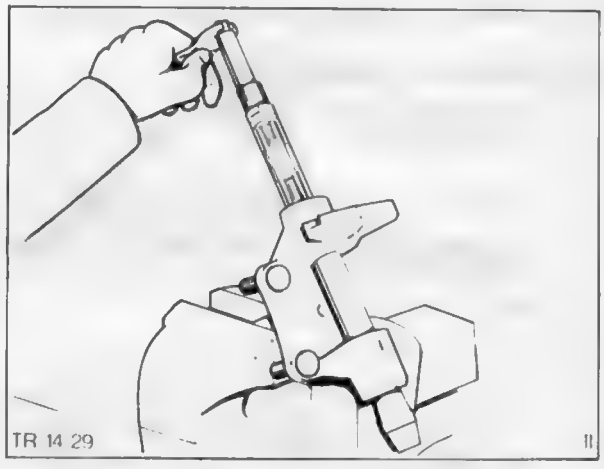


Fig. 29. Reaming stub axle bushes

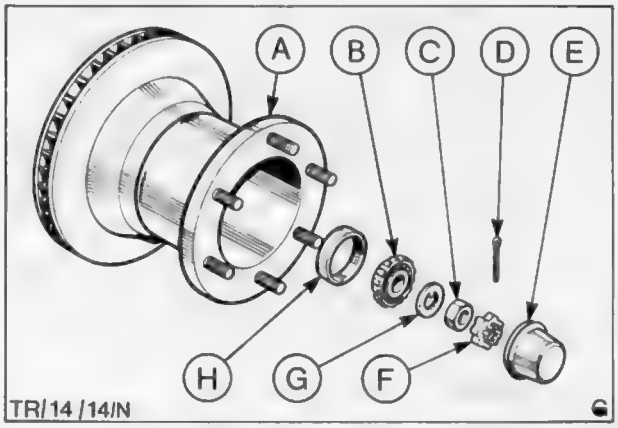


Fig. 30. Front hub and disc assembly

14 371 6 HUB ASSEMBLY – FRONT – REPLACE

Special Service Tools Required: None

1. Remove hub assembly as described in Operation 14-371. Mark both hub and disc to assist in realignment, Fig. 31.
2. Bend back lock tabs and remove bolts securing hub to disc.
3. Separate hub from disc.
4. Clean mating faces of hub and disc.

This is most important

5. Align marks made in sub-operation 1 and refit bolts and new lock tabs. Tighten bolts to specified torque and bend up lock tabs. When fitting a new disc to an old hub or vice versa the disc run-out must be checked as described in Operation 12-221. It may be necessary to rotate the position of the disc relative to the hub to bring the run-out within specification.

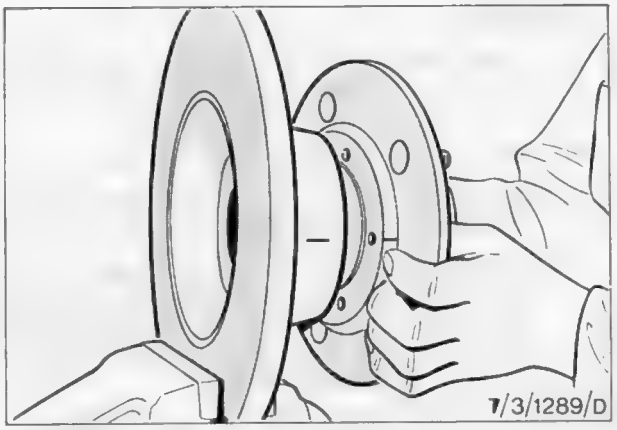


Fig. 31. Front disc and hub aligning marks

14 403 WHEEL BEARINGS – ADJUST

Special Service Tools Required:

Dial indicator holding fixture	15 022
Metric dial indicator gauge	15 046

1. Jack-up front of vehicle and fit stands.
2. Remove hub cap where fitted and wheel bearing dust cap.
3. Remove split pin and retainer.
4. Using a torque wrench tighten adjusting nut to a torque of 23 to 33 Nm (2,35 to 3,5 kgf.m) (17 to 25 lbf.ft) rotating wheel during torquing process to ensure bearings are accurately seated. Slacken adjusting nut by four flats ($\frac{2}{3}$ turns).
5. Vigorously rock wheel to settle wheel bearing, and then holding wheel firmly push and pull **(do not rock)** wheel in a horizontal plane to feel end float in the bearings.
6. The bearings must have between 0,025 to 0,13 mm (0,001 to 0,005 in) end float. This end float should be checked using a dial gauge fastened to wheel by a magnetic base or simple bracket fabricated from two nuts as shown in Fig. 26 and with the stylus of the gauge positioned against the wheel spindle. One wheel nut must be removed to fit the dial gauge using this fabricated bracket.
7. If necessary, turn wheel bearing adjusting nut either way until the correct end float is obtained. Remove dial indicator gauge and replace wheel nut, if previously removed.
8. Fit retainer and new split pin.
9. Fit dust cap and hub cap, where fitted.
10. Remove stands and lower vehicle to ground.

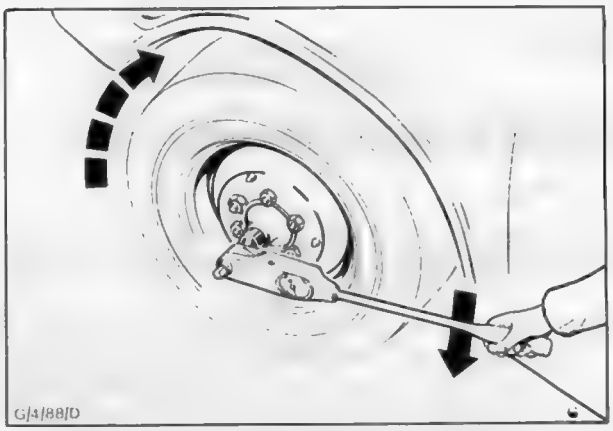


Fig. 32. Torquing front hub bearing whilst rotating wheel

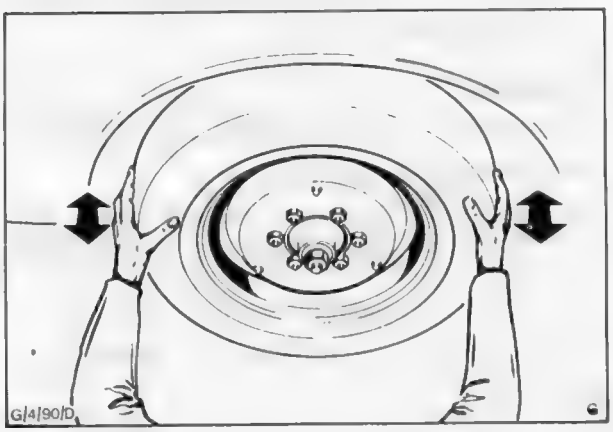


Fig. 33. Feeling end float in front hub bearings

14 411 4 WHEEL BEARINGS REPLACE – INNER AND OUTER (hub assembly removed)

Special Service Tools Required:

Front hub bearing cup replacer	14 010

To Remove

1. Remove outer bearing cone from hub.
2. Lever out grease seal from inner bearing, Fig. 34, and remove inner bearing cone.
3. Drift out both outer races from hub. Use a punch and hammer to tap alternatively at diametric opposite points of the cup, do not allow cup to tilt in hub.

   NOTE: Ensure punch is in good condition and take care not to raise burrs on cup seals as this may prevent new cups from seating properly.
4. Clean hub assembly. Discard old cone and roller assemblies.

To Replace

Note: It is essential to avoid contamination of grease and bearings.

5. Fit both bearing cups using Special Service Tool 14 010 to drift or press each cup firmly into position. Check with feeler gauges that cups are fitting tightly against abutment faces.

   NOTE: Bearing cup and roller bearing assemblies must be from the same manufacturer.
6. Pack cone and roller assemblies with lithium base grease meeting Ford Specification S-MIC-4515-A. Ensure grease is well packed between the roller.
7. Position inner bearing cone. Fit new grease retainer. Apply a light dressing of lithium-based grease between lips of retainer.
8. Fit outer bearing cone into position.
9. Protect all components from dirt or foreign matter until assembled to the vehicle.

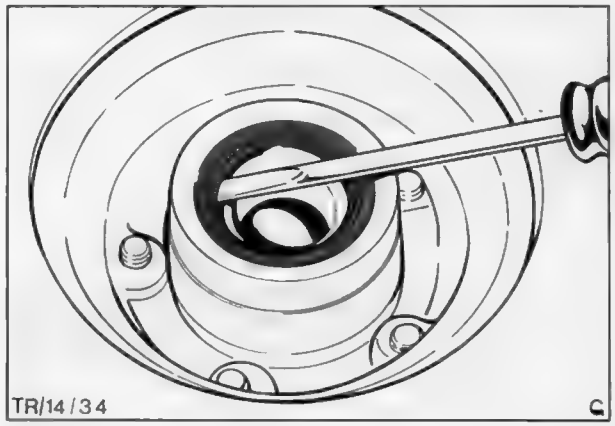


Fig. 34. Levering out grease seal

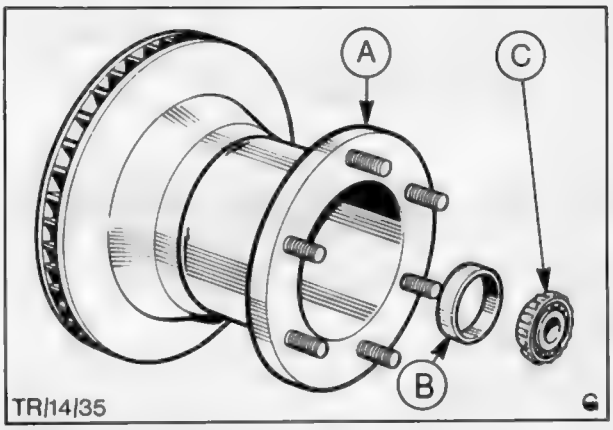


Fig. 35. Front hub and outer race
A – Front hub C – Race
B – Cup

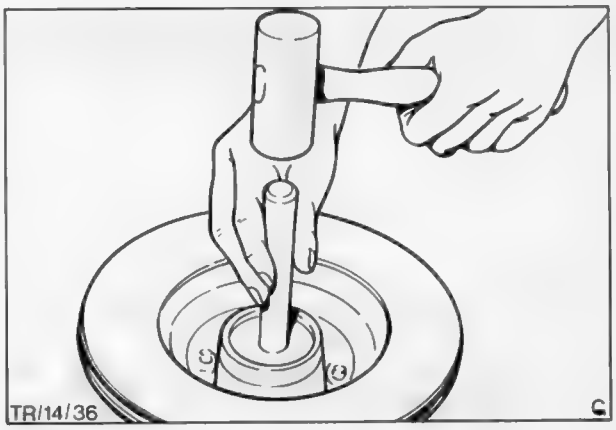


Fig. 36. Refitting inner bearing cup

14 443 STUD – REPLACE

Special Service Tools Required:

Ball joint separator 13 006

To Remove

1. Remove hub cap, if fitted.
2. Jack-up front of vehicle and fit stands.
3. Remove front road wheel. Using ball joint separator, Fig. 37, Special Service Tool No. 13 006 press stud out of hub flange or on models where tool does not fit, tap out stud with mallet.

To Install

4. Lightly lubricate new stud splines, locate stud in its hole and draw it into position using a suitable spacer, and a wheel nut reversed, i.e. tapered face outwards.
5. Fit road wheel, replace wheel nuts.
6. Remove axle stands, lower vehicle to ground.
7. Fully tighten wheel nuts to specified torque and, replace hub cap.

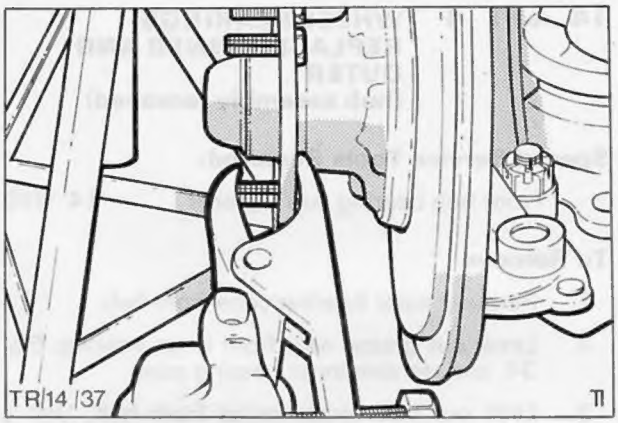


Fig. 37. Removing wheel stud using Special Service Tool 13 006

14 621 FRONT SPRING – REMOVE AND INSTALL

Special Service Tools Required: None

To Remove

1. Remove hub caps where fitted, and loosen wheel nuts.
2. Jack-up vehicle and fit stands at front and remove front road wheels.
3. Remove four nuts from 'U' bolt and remove bolts, wedges and bump rubber.
4. Remove two nuts from rear spring shackle plate, withdraw shackle plate.
5. Remove nut and bolt securing front spring eye to body and remove spring, Fig. 39.

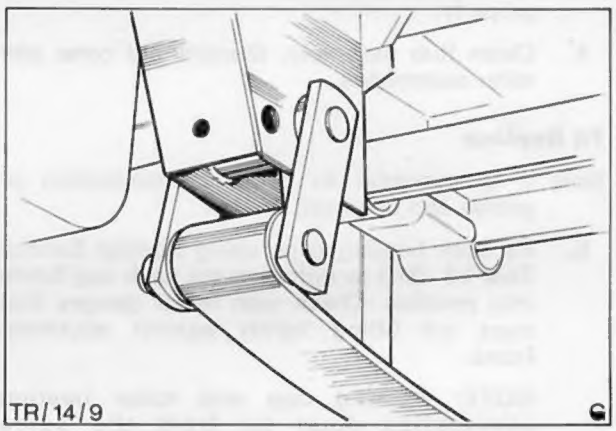


Fig. 38. Rear spring shackle plate

To Install

6. Position spring and fit front eye bolt and nut but do not fully tighten.
7. Fit rear spring shackle plate and secure with two nuts, but do not fully tighten.

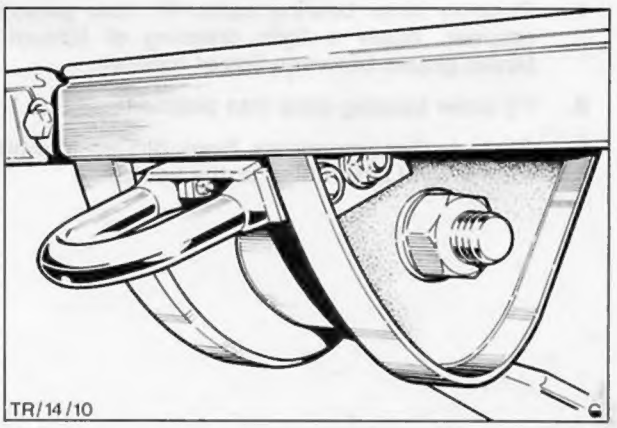


Fig. 39. Front spring eye bolt

8. Position bump rubber on spring ensuring packing wedge is correctly positioned between spring and beam with the thicker portion of the wedge rearwards.
9. Secure bump rubber and spring with 'U' bolts. Tighten nuts to secure.
10. Fit front road wheel.
11. Lower vehicle to ground.
12. Tighten rear spring hanger and front eye nuts to the specified torque. Tighten spring 'U' bolts, refer to Technical Data for correct procedure, Fig. 40.
13. Finally tighten wheel nuts and fit hub cap where fitted.

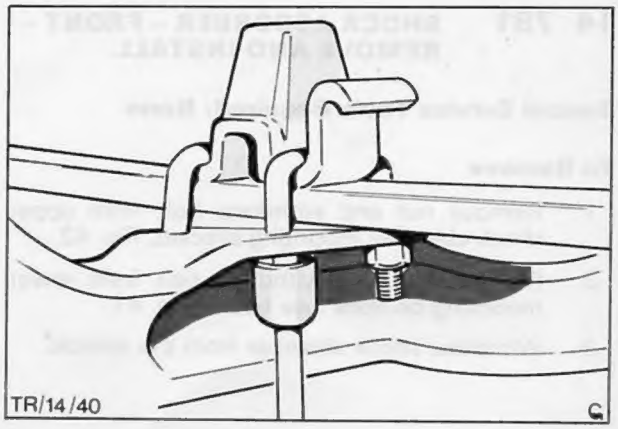


Fig. 40. Tightening spring 'U' bolts

14 653 BUSHES – FRONT SPRING – REPLACE – ALL

Special Service Tools Required: None

To Remove

1. Remove front spring as described in Operation 14-621.
2. Pull out bushes from rear spring eye.
3. Place spring in press and by using a suitable adaptor press out bush from front spring eye.

To Replace

4. Fit new bush to front spring eye using a suitable adaptor and press.
5. Fit new bushes to rear spring eye.
6. Install front spring as described in Operation 14-621

14 673 'U' BOLTS – FRONT SPRING REPLACE

To Remove

1. Jack-up, fit stands.
2. Remove nuts from both 'U' bolts, and remove bolts.

To Replace

3. Install new bolts ensuring bump rubber and packing wedge between spring and axle are correctly positioned, Fig. 41.

   The thicker portion of the wedge faces rearwards.
4. Secure 'U' bolts with nuts and tighten. Nuts must be finally tightened with the vehicle weight on the wheels, refer to Technical Data for correct tightening procedure.
5. Lower vehicle to ground.

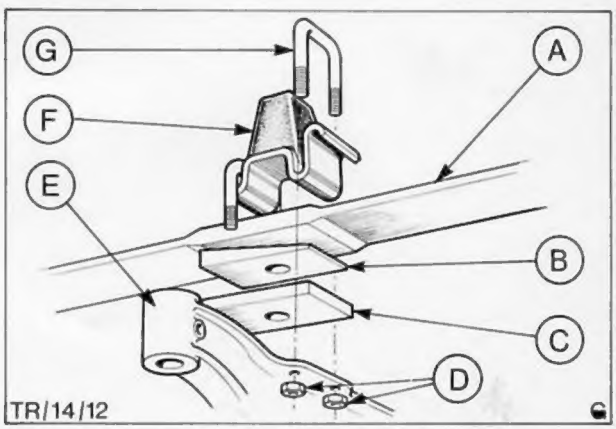


Fig. 41. Front spring and 'U' bolt assembly

14 791 SHOCK ABSORBER – FRONT – REMOVE AND INSTALL

Special Service Tools Required: None

To Remove

1. Remove nut and withdraw bolt from upper shock absorber mounting bracket, Fig. 42.
2. Remove nut and withdraw bolt from lower mounting on front axle beam, Fig. 41.
3. Withdraw shock absorber from the vehicle.

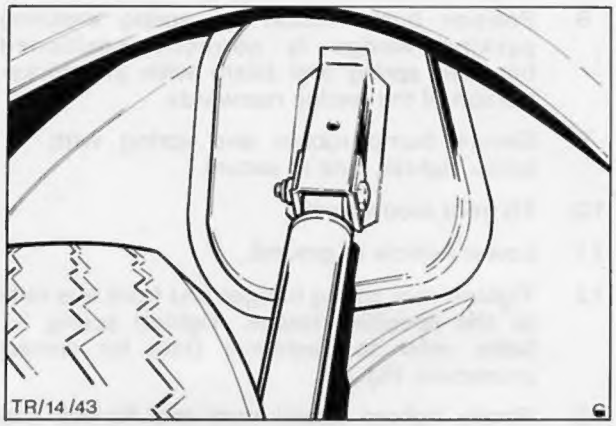


Fig. 42. Shock absorber upper mounting

To Install

4. Position shock absorber on its upper and lower mounting positions.
5. Insert lower mounting bolt from outside to inside, and secure with nut, tightening to the specified torque.
6. Insert upper mounting bolt from rear to front and secure with nut, tightening to the specified torque.

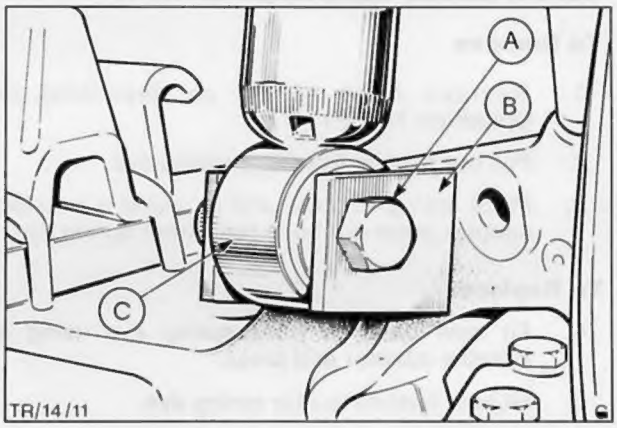


Fig. 43. Shock absorber lower mounting

TECHNICAL DATA

Front Suspension

Suspension type	Forged steel I Section beam supported by semi-elliptic springs. Springs are single rate with a parabollic taper
Shock absorbers	Telescopic hydraulic double acting
Castor	75–115: 5° 45′ max., 3° 15′ min. 130–190: 6° max., 4° min.
Camber	0° to 1°
Toe-in	2,38 to 3,97 mm (0,094 to 0,156 in)— Cross ply tyres 0,00 to 1,60 mm (0,00 to 0,063 in)— Radial ply tyres
Kingpin inclination	5°±10′
Spindle body to axle beam clearances	0, 1 mm (0,004 in) max. 0,025 mm (0,001 in) min.

Wheel bearings

Tightening torque	23 to 33 Nm (2,35 to 3,5 kgm) (17 to 25 lbf.ft) Back off nut to give end-float of 0,025 to 0,13 mm (0,001 to 0,005 in)

Front Springs

Type	Semi-elliptic mounted on rubber bushed shackles and pins

Tightening Torques	Nm	kgf.m	lbf.ft
Shock absorber mounting bolts	70 to 90	7 to 9	51 to 66
Caliper to mounting bracket	90 to 110	9,0 to 11,0	66 to 81
Spring 'U' bolts 1st stage	20 to 25	2.0 to 2,5	15 to 18
2nd stage	40 to 45	4,0 to 4,5	30 to 33
Final stage	54 to 61	5,4 to 6,1	40 to 45
Steering arm to stub axle bolts	55 to 63	5,5 to 6,3	40 to 46
Disc to hub	48 to 62	4,8 to 6,2	37 to 44
Wheel nuts—5 stud wheels	75 to 95	7,5 to 9,5	55 to 70
—6 stud wheels	155 to 180	15,5 to 18,0	114 to 132